

What is claimed is:

1. A method for manufacturing a thyristor-based semiconductor device having a substrate and a thyristor body region therein, the method comprising:

- etching a trench in the substrate and adjacent to the thyristor body region, the trench having a bottom;
- implanting a portion of the thyristor body region and a first portion of the substrate that is adjacent to the bottom of the trench with a first dopant at a first implant energy, thereby forming a first doped well region and a first base region of the thyristor body region;
- annealing the first doped well region;
- implanting a first thyristor emitter region in the first doped well region and contiguously adjacent to the first base region, the first thyristor emitter region being of a polarity that is opposite the polarity of the first doped well region, the first doped well region being susceptible to carrier accumulation via carrier drainage from the first thyristor emitter region;
- forming a carrier coupler electrically coupled to the first doped well region, the carrier coupler being configured and arranged to drain carriers accumulated in the first doped well region; and
- forming a control port in the trench and adapted to capacitively couple to the thyristor body and to control current in the thyristor body.

1 2. The method of claim 1, further comprising:
2 using a second implant at a second implant energy that is higher than the first
3 implant energy, implanting a second portion of the substrate that is below the trench and
4 contiguously adjacent to the first doped well region with a second dopant, thereby
5 forming a second doped well region, the first and second doped well regions being of the
6 same polarity; and
7 wherein forming a carrier coupler electrically coupled to the first doped well
8 region includes forming conductive material extending to the second doped well region
9 and electrically coupled to the first doped well region via the second doped well region.

1 3. The method of claim 1, further comprising:
2 forming a carrier recombination center in a current path through the first emitter
3 region.